

Although there are no new depositional age constraints for the younger Bigie Formation, field relationships suggest that it is coeval with the ~1710 Ma Fiery Event. Therefore, we have defined a separate supersequence for the Bigie Formation, the Big Supersequence, even though it may be more genetically related to magmatism of the Fiery Event. The Big Supersequence, together with the ~1690 Ma Prize Sequence, comprises the Calvert Superbasin.



Magmatic event times refined

New SHRIMP data has also refined ages for the Burstall, Fiery and Sybella magmatic events (figure 1). The ~1740–1735 Ma Burstall Event represents a bimodal, dominantly intrusive event following sedimentation of the Quilalar Supersequence in the Mary Kathleen Zone and the Eastern Succession. The refined age for the Weberra Granite is within error of the age for the Fiery Creek Volcanics, and indicates that they are both part of the ~1710 Ma Fiery Event.

The three new SHRIMP ages for the Sybella Granite are all within error of each other and are coeval with the Carters Bore Rhyolite, indicating that magmatism associated with these intrusives is constrained to 1675–1670 Ma. Slightly younger ages from other units of the Sybella Granite may indicate that intrusive sheets associated with the Sybella Event were emplaced over an extended time, or as a series of discrete magmatic ‘pulses’ between 1675 and 1655 Ma, associated with and followed by deposition of the Gun Supersequence.

Testing depositional ages from detrital zircons in sedimentary rocks

Detrital zircons have also been used to characterise the Gun unconformity at four locations in the Leichhardt River Fault Trough. Detrital zircons in sedimentary units overlying the Gun unconformity at the Oxide Creek and Bull Creek sections provide maximum depositional ages of 1674 ± 6 Ma and 1672 ± 15 Ma, consistent with the age constraints of ~1660 Ma provided by peperites for deposition of the basal Gun Supersequence highstand.

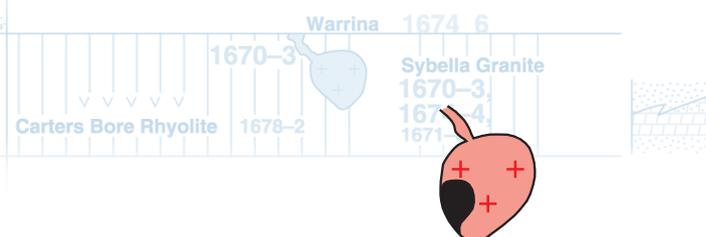
These examples suggest that samples taken directly above regional unconformity surfaces can be used to constrain depositional ages for supersequences. However, in the other two sections the small numbers of young grains, or absence of younger populations, may mean that the maximum depositional ages calculated from detrital zircons are substantially older than the actual age of deposition.

Therefore, it is crucial that maximum depositional ages calculated from sedimentary units be integrated with sequence stratigraphy and basin analysis in Proterozoic basins to construct detailed chronostratigraphic event charts.

References

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~1800 Ma

